

Last name \_\_\_\_\_

First name \_\_\_\_\_

**LARSON—MATH 656—CLASSROOM WORKSHEET 04**  
**Matching Theory.**

**Concepts & Notation**

- Sec. 3.1: matching, saturate, maximum vs. maximal matching,  $M$ -alternating path,  $M$ -augmenting path, Berge's Theorem, Symmetric Difference Lemma, Hall's Condition, Hall's Theorem, Marriage Theorem,  $k$ -regular bipartite graph theorem, vertex cover, König-Egervary Theorem, independent set, edge cover, Gallai Identities.

**Review**

1. What is *Hall's Theorem*?
2. What is the Marriage Theorem?
3. What can we say about  $k$ -regular bipartite graphs?

## Notes

1. What is a vertex cover?
2. What is the notation for the vertex covering number—and the matching number?
3. What is the König-Egerváry Theorem?
4. Prove it!
5. What is a *min-max relation*? What is an example?
6. What is an *independent set*? What is the *independence number*?
7. What is the relationship between independent sets and vertex covers?
8. What is an *edge cover*?
9. What are the Gallai Identities?
10. Prove them!